PRELIMINARY OPERATING INSTRUCTIONS

FOR

TYPE 190-A Q-METER

#3210

BOONTON RADIO CORPORATION
BOONTON, NEW JERSEY
U. S. A.

MP MASTER
MA24318

OPERATING INSTRUCTIONS

FOR THE

TYPE 190-A Q METER

These Operating Instructions are of a temporary nature but sufficient for operation of the instrument. A permanent book will be issued in the near future and forwarded to you. PLEASE RETURN the ATTACHED SELF ADDRESSED CARD to INSURE that the PERMANENT BOOK REACHES YOU.

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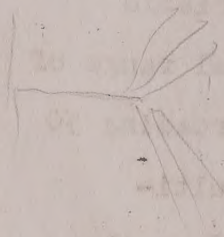
PRELIMINARY INSTRUCTIONS FOR MODEL 190-A Q METER

GENERAL

The Boonton Radio Corp. Model 190-A Q Meter operates over a frequency range of 20 to 260 mc, in four continuously-variable bands. Indicated frequency is accurate to ±1%. The total range of Q measurement is from 5 to 1200, by means of the direct-reading 50 to 400 Q voltmeter, in combination with the 0.5 to 3.0 multiplier (XQ) control and scale. Very low Q values are read on the LO Q scale, which is calibrated from 10 to 100. Delta Q values are measured directly on the 0 to 100 $\triangle$Q scale. All scales, Q, LO Q and $\triangle$Q, read directly when XQ is set at unity; at other values of XQ, the readings obtained must be multiplied by the reading on the XQ scale.

The accuracy of measured circuit Q values is ±5% below 100 mc; ±12% above 100 mc, at a circuit Q of 400 as read directly on the meter. The internal resonating capacitor reads directly on the MMFD dial, which is calibrated in 0.1 mmf increments from 7.5 mmf to 100 mmf. The accuracy is ±0.2 mmf below 20 mmf, ±0.3 mmf between 20 and 50 mmf, ±0.5 mmf between 50 and 100 mmf.



Six tubes are used; two 5718's, two 9005's, one 12AT7 and one 0B2. The power supply is internally regulated and operates on inputs of 90 to 130 volts at 60 cps only. A special instrument, the 190-AP Q Meter, is required for 50 cps operation.

INSTALLATION

The BRC Model 190-A is ruggedly built, but should be handled with the care required by any precision instrument. Connect the binding post at the rear of the cabinet to a good ground, to improve stability. When the power switch is turned ON, the pilot lamp should light. After about one minute, if the SET XQ knob is not fully counterclockwise, the Q voltmeter needle should show a reading when the XQ key is depressed. A negative swing indicates that the Q voltmeter zero requires adjustment.

OPERATING PROCEDURE

I. Warm-up and Initial Setting

1. Turn the power switch ON.
2. Allow the instrument to warm up. For precise measurements, the warm-up period should be at least 30 minutes.
3. Connect a stable work coil to the COIL terminals on the top of the instrument.
4. Turn the SET XQ control to zero (fully CCW).
5. Using the Q zero potentiometer (small knob "Q" below Q voltmeter), carefully zero the meter needle.
6. Depress the LO Q key and again zero the needle with the Q zero knob.
7. Check the meter zero with and without the LO Q key operated. The zero readings should be the same.

8. Depress the XQ key and zero the meter needle with the XQ zero potentiometer (small knob "X" below Q voltmeter).

9. Check the meter zero with and without the XQ key operated. The zero readings should be the same.

II. Q Measurement

1. Connect the coil to be measured to the COIL terminals on the top of the instrument (after the steps above have been taken).

2. Set the FREQ. RANGE switch to the proper range and the MC dial to the exact frequency desired.

3. Depress the XQ key and turn the SET XQ knob until the meter needle reads the desired multiplying factor, on the XQ scale. (The unity factor is calibrated with the highest accuracy and is recommended for use, whenever possible.)

4. Resonate the coil with the MMFD dial as indicated by max deflection of the Q Voltmeter.

5. Read the indicated Q on the Q scale of the meter.

6. If XQ was set to any value other than unity, multiply the indicated Q reading by the appropriate XQ factor. This gives the Q of the tuned circuit comprising the work coil and the internal circuit of the Q Meter. In most cases, this reading is essentially equal to the Q of the work coil.

   Note: If it is desired to hold the circuit capacitance constant, follow the above steps, but set the desired capacitance with the MMFD dial and resonate with the

FREQ. RANGE switch and MC dial. It will be necessary to reset XQ to the desired multiplier after making the frequency setting, then re-resonate with the MC dial. This operation will be repeated more than once if the XQ multiplier is changed materially.

III. LO Q Measurement

1. For accurate Q measurements of less than 100 (XQ = 1), follow the instructions above, depress the LO Q key and read the final result on the LO Q scale.
2. If XQ other than unity was used, calculate the final Q value.

IV. ΔQ Measurement

1. The ΔQ feature of the BRC Model 190-A Q Meter makes possible direct measurement of the difference between Q values when L, C or R is added to the work coil.
2. Connect the work coil to the COIL terminals and resonate, as described above.
3. Set the coarse ΔQ control (outer knob) for the approximate Q range of the reading just obtained.
4. Operate the ΔQ key. Set the meter needle to zero on the ΔQ scale, using the coarse and fine (inner) ΔQ controls.
5. Add the unknown in parallel, or if necessary in series, combination with the work coil.
6. Re-resonate the instrument.

7. Operate the $\triangle Q$ key and read the Q difference directly on the $\triangle Q$ scale. If the meter needle reads off scale ($\triangle Q$ too high), remove the unknown, reset XQ to a higher value and repeat the above steps.
8. If XQ reads other than unity, multiply the $\triangle Q$ reading by the XQ factor.

OPERATING HINTS AND CAUTIONS

For methods of connecting specimens, precautions to be observed for maximum measuring accuracy and other information regarding the best use of this instrument, refer to the BRC "Instructions and Manual of Radio Frequency Measurements" for the Type 160-A Q Meter, which accompanies this temporary instruction sheet. Further information will appear in the complete Instruction Book for Model 190-A, to be issued shortly.

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